

PHARMACEUTICAL STUDY AND PRELIMINARY ANALYSIS OF HERBAL ALKALINE FORMULATION PALASHA KSHARA

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ABSTRACT

Introduction: Kshara is the alkaline substances obtained by processing ash of drugs. The pharmaceutical technology of processing alkaline drugs to obtain a dosage form is called as Kshara Kalpana. Kshara is termed so because it has ability to scrape the tissues or erode unwanted growths. Kshara Kalpana can be of mrudu (mild potency) madhyama (Moderately potent) and teekshna (Potent) varieties based on potency. When used externally they are called as pratisaraneeya kshara and paneeya kshara when used internally. There are three, five and eight kshara enumerated based on number of alkaline drugs in group with similar characteristics. Palasha kshara is a herbal alkaline material prepared out of Palasha (*Buteamonosperma Lamk.*) **Materials and methods:** Kshara was prepared from dried leaves, root, stem, flowers and fruits of Palasha plant (*Buteamonosperma Lamk.*). The final product was analysed for selected preliminary parameters as per API. **Results:** The yield was 13% and the pH of the final product was 10.34. The Physicochemical characters of the study drug were within the pharmacopeial limits. **Discussion:** The raw materials selected for the study was of genuine quality and were comparable with API standards. Pharmaceutical and analytical studies on palasha kshara could generate preliminary standards of study drug. Alkaline pH of the final product was with in pharmacopeial range and supports its inclusion under ksharashtaka. Microscopic studies of final product could be used for future references as a standard monograph.

KEYWORDS: Ayurveda, Ksharashtaka, Palasha kshara, preliminary standards.

INTRODUCTION

Kshara is the alkaline substances obtained by processing ash of drugs.^[1] It is termed so because of corrosive nature of the formulation. By virtue of its properties it is capable of scraping the unwanted tissues of skin and muscles^[2]. Because of this property it is therapeutically used in diseases like gulma, shula and scraping of excessive accumulation

of mala. Therapeutically kshara kalpana is considered with great importance in kayachikitsa and shalyatantra. In kayachikitsa it is useful in treating diseases like kustha, gulma and mutraghata. It can be used in diseases like arsha, bhagandara and nadvirana. It can be administered by a clever physician to rapidly cure even the ailments of severe nature. It is said that the diseases which are difficult to treat can be cured by kshara therapy. It is a significant formulation which is termed as Anushastra as it can be used in surgical conditions where patient is not suitable for surgery. It suits better for women, children and for those who are afraid of surgery. It controls bleeding, reduces chances of re-occurrence and wound infection is very rare with use of kshara.^[3-4]

The manufacturing process of kshara has been explained in detail in the books of Ayurveda. The drugs suitable for preparation of kshara have to be identified and collected. After complete drying of the drugs they will be crushed in to smaller pieces. Then they will be heaped in an open area on a dry and clean platform. Ignited and burnt completely to convert the drug or drugs in to ash. After self-cooling, the ash will be then dissolved in 4 times or 6 times water. Mixture shall be stirred well & kept undisturbed for a night. Next morning, supernatant fluid has to be decanted and filtered for 21 times. After filtration, the clear liquid obtained is called ksharodaka. The ksharodaka has to be taken in a clean wide mouthed iron vessel and boiled over fire to dehydrate the contents. After complete drying the kshara will be available in the form of powder which usually will be in white colour.^[5-9]

There are two types of kshara on the basis of form in which it is used. Liquid form of kshara will be like a decoction and called paneeya kshara and the solid or amorphous variety of kshara will be in powder form which is termed as pratisaraneeya kshara or churna kshara.^[10] On the basis of the number present in the group, the kshara are classified like dvikshara, trikshara, ksharapanchaka and ksharashtaka. The alkaline materials with similar guna and karma are grouped in this manner.^[11-12]

Palasha (*Buteamonosperma Lamk.*), a herbal drug known for its kshara property is considered one among ksharapanchaka^[13-18], ksharashatka^[14,17], kshara saptaka^[18,19] ksharashtaka^[13,15,17,18,20], kshara dashaka.^[21] Palashakshara is considered as ksharashreshtha.^[17,22] Kimshuka kshara, parna kshara and triparna kshara are the other names of Palasha kshara. It helps to improve digestive capacity of an individual, capable of curing growths, splenomegaly, hepatomegaly, dysurea and calculi.^[23]

Palasha is commonly known as Flame of forest, belongs to the family Fabaceae. It is a medium sized tree which grows upto 12 - 15 meters with slightly crooked trunk and irregular branches. Bark will be rough, ash coloured. Trifoliate leaves with 10-15 cm long petioles. Commonly found throughout India upto altitude of 915m, except in very arid parts. It is called Kimshuka or Raktapushpaka in Sanskrit, Muttuga or Muttala in kannada, Dhak or Tesu in hindi and Bastard teak in English.^[24] Based on the colour of flowers four types of palasha have been identified namely Rakta (Red), Peeta (Yellow), Shweta (White) and Neela (Blue).^[25]

Palasha is considered sacred, because of the tri-foliate formation of its leaves, which represents the holy trinity with Vishnu in the middle, Brahma on the left and Shiva on the right. Dry twigs of the plant are one of the Samidha considered to be very pious for sacrificial fire (Homa).^[26] The importance of Palasha in Indian Tradition could be established by the fact that one who just touches or sees the tree gets rid of all sins.^[27] Therapeutically, Palasha is pungent, astringent, bitter in taste and cold in potency. It enhances the digestive power and appetite. It improves sexual vigour. It is indicated in ulcers, swelling, piles and worm infestation. It is beneficial in joining of bones in case of

fractures.^[28] The bark, seed, root, leaves and flowers of palasha are known for medicinal qualities. There are many recipes that can be prepared with useful parts of palasha. For instance the paste or juice of palasha seed taken with rice water is useful in alleviating worm infestation.^[29] Another instance of using the paste of seeds with honey is advocated for worms.^[30] Soup prepared with palasha when consumed with sugar will treat colic.^[31] It is reported that the crude extracts of various parts and pure isolates of palasha possess antibacterial, antifungal, hypoglycemic, anti-inflammatory activities. Further, *Butea monosperma* is known for tonic, astringent, aphrodisiac and diuretics properties.^[32]

All medicines, whether synthetic or of plant origin, should fulfill the basic requirements of being safe and effective. Standardization is way of achieving it with the help of standards of characteristics, constant parameters, and definite qualitative and quantitative values.^[33] Pharmaco-gnostic standardization of formulations is essential so that the product is ensured for its quality when tested and shows appropriate therapeutic efficacy.^[34] In this work an attempt is made to prepare and analyse Palasha kshara.

MATERIALS AND METHODS

Palasha kshara was prepared as per references of authentic books of Ayurveda and was analysed with parameters of quality assessment. The details of pharmaceutical and analytical work are detailed below.

I. Pharmaceutical work

Five parts of a plant (panchanga) namely leaves, root, stem, flowers and fruits of Palasha plant (*Butea monosperma Lamk.*) were collected and dried in sunlight. To check the genuinity of the drug collected, morphological characteristics, organoleptic features and comparison with standard herbarium were used to establish the identity of the collected drug. After complete drying of Palasha, preparation of kshara was carried out. The general method of preparation of kshara was followed for preparation of Palasha kshara.^[35]

After complete drying of the drug it was chopped in to smaller pieces. From total drug, 10 kg of drug was taken and completely burnt in to ashes. After self-cooling, the ash was collected and weighed. The ash was then dissolved in 6 times (v/v) potable water. Mixture is stirred well & kept undisturbed overnight. Next morning, supernatant fluid is decanted and filtered for 21 times. After filtration, the clear liquid (ksharodaka) was collected in a clean wide mouthed iron vessel. It was then boiled and stirred constantly to get dry powder. The white coloured kshara was obtained.

II. Analytical Work

The analytical work was carried out on selected parameters specified in protocol for testing Ayurveda drugs published by CCRAS.^[36] The details of procedures carried out are as follows:

1. Powder microscopy: The drug was powdered and sieved through 80 sized mesh. A pinch of the sample was placed on a microscopic slide with a drop of glycerin-water. Characters were observed using trinocular microscope under bright field light. Magnifications of the figures are indicated by the pre-calibrated scale-bars using software.
2. Total Ash: The sample was weighed to 2 gms in a tared platinum crucible and incinerated at temperature not exceeding 450°C until carbon free ash is obtained. Percentage of ash was calculated with reference to weight of the sample.
3. Acid insoluble Ash: 25 ml of dilute Hydrochloric acid (HCL) was added to crucible containing total ash. The insoluble matter was collected on ashless filter paper (Whatmann 41) and washed with hot water until the filtrate is neutral. The filter paper containing the insoluble matter was transferred to the original crucible. Dried on a hot

plate and ignited to constant weight. The residue was allowed to cool in suitable desiccator for 30 mins and weighed without delay. The content of acid insoluble ash was calculated with reference to the air dried drug.

4. Water soluble ash: The ash boiled for 5 min with 25 ml of water and insoluble matter was collected on an ashless filter paper. Washed with hot water, and ignited for 15 min at a temperature not exceeding 450°C. The weight of the insoluble matter was subtracted from the weight of the ash. The difference in weight represents the water-soluble ash with reference to the air-dried sample.
5. Determination of pH: 10 ml of distilled water was added to 1 gm of sample, stirred well and filtered. The filtrate was used for the experiment. Instrument was switched on and allowed to warm for 30 minutes. At first the pH 4 solution was introduced and the pH adjusted by using the knob to 4.02 at room temperature. Similarly calibrated using standard solution with pH 7 and 9.2. Then the sample solution was introduced and reading was noted. The test was repeated for four times and the average reading were noted.

OBSERVATION AND RESULTS

The data collected at different steps like collection of raw drug, authentication, pharmaceutical and analytical works are given in table 1 to 5 and figure 1.

Table 1: Physico-chemical characters of drug.

Parameter	Observed value	API standard ^[37]
Total ash	5.89	Not more than 12%
Acid insoluble ash	0.2	Not more than 1.5 %
Water soluble extractive	1.29	Not less than 14%

Table 2: Organoleptic characters of Palasha ash & Ksharodaka.

Parameters	Palasha ash	Ksharodaka
Colour	White	Grey
Odour	Characteristic	Characteristic
Taste	Bitter	Salty
Appearance	Fine powder	Viscous liquid

Table 3: Pharmaceutical data of Palashakshara.

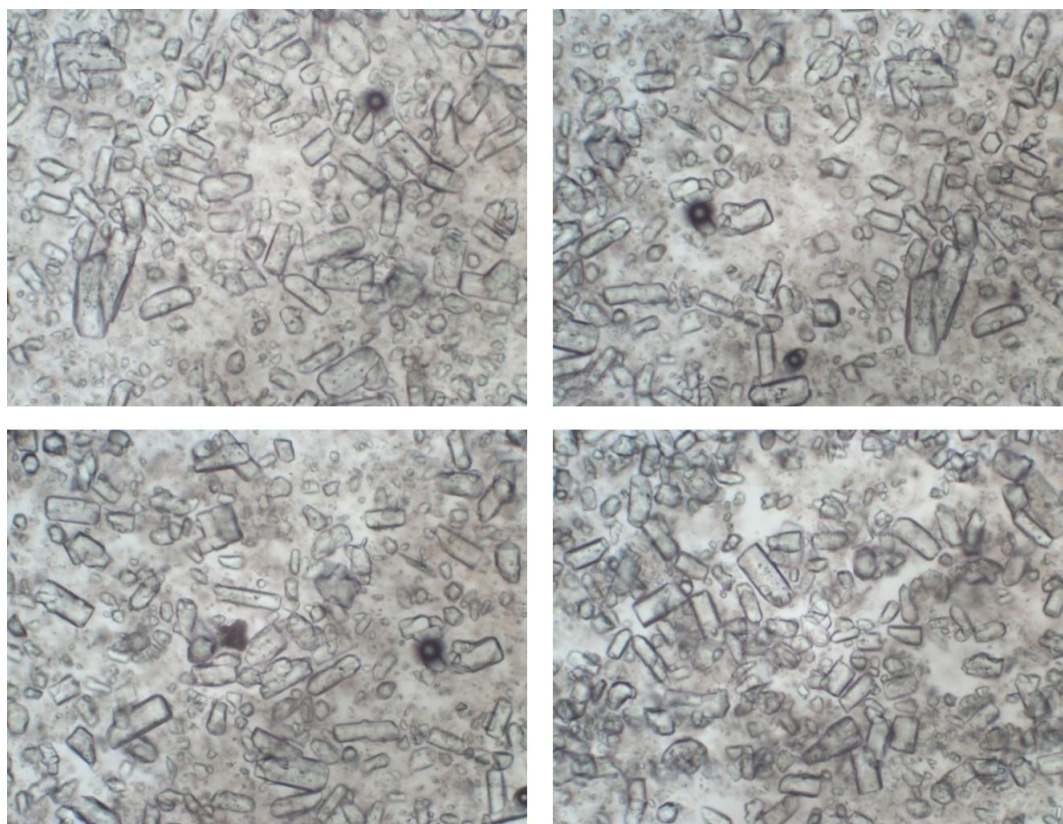
Weight of fresh Palasha panchanga collected	11 kg
Weight of dried Palasha panchanga	10.5 kg
Loss in weight after drying	500 gms
Percentage of loss after drying	4.54%
Number of days required for drying	12 days
Total weight of ash obtained after burning the dried panchanga	1000 gms
Loss in weight	9000 gms
Percentage of ash when compared with dried panchanga	10%
Percentage of ash when compared with fresh panchanga	9.09%
Weight of kshara obtained	130 gms
Percentage of kshara when compared with ash	13%
Percentage of kshara when compared with fresh panchanga	1.3 %
Number of days required for kshara preparation after complete drying of drug	5 days

Table 4: Physico-chemical parameters of Palashakshara.

pH	10.84
Total ash	79.3
Acid insoluble ash	0.1
Water soluble ash	77.36

Table 5: Ash obtained and final quantity of Kshara obtained.

Sl	Name of drug	Quantity of raw drug taken	Ash obtained	Kshara obtained
1	Palasha	10 kg	1000 g	130 g

**Figure 1: Powder microscopy of palashakshara.****DISCUSSION**

In the present work an attempt was made to prepare palasha kshara and check the quality of the final product. As per the protocol the quality of the raw drug was assessed in the beginning. It is observed that Ash value and acid soluble ash of palasha panchanga were within the pharmacopeial limits. The water-soluble extractive however did not match with the standards (Table 1). Variation in the percentage of water-soluble extractive value can be attributed to place and time of collection. Further, five parts of plant palasha were used for the analysis in the present study. The physico-chemical characteristics mentioned in pharmacopeia belong to bark of palasha. However, considering 2 observations out of three qualified for identity purity and strength, it can be deemed supportive in assurance of quality of raw drug used in the preparation.

Loss of 500gms of weight (Table 3) after drying indicates that the moisture present in the drug is comparatively less. Weight of ash obtained in the present study was 10% (Table 3) which may reflect in the cost of the final product. Ash of palasha panchanga was in powder form and white after complete burning (Table 2). This may be due to complete burning of drug without leaving behind unburnt traces. The odour was characteristics and the taste of ash was bitter, may be due to alkalinity. The final product was white which goes with description in the literatures of Ayurveda.^[8-9] The final yield was 1.3% when compared to the fresh drugs collected. Earlier studies^[38] have recorded a yield of 2.3%.

The pH of the kshara was 10.84 in this work (Table 4). This observation suggests that the final product supports inclusion of palasha under kshara and also fulfils pH between 10-12 of pharmacopeial range.^[39] The acidity or alkalinity of a product has a profound influence on the decomposition of drug.^[40] If it is very acidic or less alkaline there will be more decomposition of the drug. When the pH is low, the product readily gets oxidized. This indicates that pH of palasha kshara may influence positively on the stability and shelf life of finished product. Earlier studies^[38,41-43] have recorded a pH of palasha kshara as in between 9.7 to 11.98.

Total ash in the final product of palasha kshara indicates that there were almost 79.3% of constituents rather of inorganic nature (Table 4). The procedure of heating the kshara at a temperature of 450°C until carbon free material is obtained removes possible organic materials present in the product. Earlier studies^[41] on palasha kshara have shown a total ash of 92.94.

Acid insoluble ash is a usual test carried out to evaluate the percentage of insoluble inorganic content of the sample in dilute acid. As all the substances taken orally pass through a phase of digestion in hydrochloric acid this test has a therapeutic significance. Kshara is prepared by dissolving this ash in water and after filtering dried by the heat, in this process, an insoluble substance like silica is being separated by the filtration and soluble substances like potassium and sodium remain in the solution^[44]. Further it is pertinent to note that the permitted level of acid insoluble ash is not more than 1% in palasha kshara.^[39]

In the final product of palasha kshara there was only 0.1% of acid insoluble ash, which suggests that there may not be any problem for digestion of this material when consumed orally (Table 4).

Water soluble ash indicates the percentage of solubility of contents of the sample in water. In the present work it was 77.36% indicating almost all contents of final product were soluble in water (Table 4). The method of preparation of kshara involves mixing of the water keeping it overnight for extraction and then dehydration of waters soluble phyto-constituents after repeated filtration. So naturally the final product should result in more water-soluble ash.

Microscopic studies of final product showed crystal mass, brown content and uneven shaped crystals (Figure 1). The plates of microscopic studies can be used for further references as standard monograph.

CONCLUSION

In this work an attempt was made to carry out pharmaceutical study to prepare kshara from palasha (*Butea monosperma Lamk.*). Then the prepared kshara was subjected to preliminary physicochemical analysis as per standard guidelines. The results obtained in this study can be considered as preliminary standards of palasha kshara. Authentication of raw drug palasha could generate analytical data to prove that the raw drug used in the study was of genuine quality and comparable with API standards. The pH of the final product was in pharmacopeial range supports its alkaline nature and justifies its inclusion under ksharashtaka; a group of eight alkaline herbs. Microscopic studies of final product could be used for future references as a standard monograph.

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Conflict of interest: None

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